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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/550,331	04/14/00	TANAKA	T 0023--1785-3

IM62/0313
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EXAMINER

TRAN, L

ART UNIT	PAPER NUMBER
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1722

DATE MAILED:

03/13/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p>09/550,331</p>	<p>Applicant(s)</p> <p>TANAKA ET AL.</p>	
	<p>Examiner</p> <p>Len Tran</p>	<p>Art Unit</p> <p>1722</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|--|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: |

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 8 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 8, the term compression ratio is vague since applicant did not disclose how the compression ratio was calculated. As to claim 24, there are no active positive step to the method claim.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4, 7, 17, 21, 22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (US Patent No. 5,501,266) taken with Bradley et al (US Patent No. 5,040,589).

Wang et al discloses a method and apparatus of injection molding of semi solid metals comprising: a screw extruder (8) located substantially vertically and having an extrusion screw (18) rotationally at the inside of a chamber (19) (col 5, lines 8-12); a colling unit (24) for cooling a light metal material supplied in the chamber so as to be formed into a molten metal or semi solid solidified slurry (col 5, lines 20-24); wherein the chamber also comprise a heating unit (25) for heating the material inside; a nozzle (28) connected at a base end thereof to a discharge port of the chamber and having a discharge port formed at a distal end thereof (col 5, lines 25-27); a hopper (1) is for storing the molten metal connected to an upper portion of the chamber (19) (col 4, line 51); the screw extruder (8) has an injection function of moving the extrusion screw in the axial direction to inject the molten metal or semi solidified slurry (fig 3); wherein the round portion is formed to a joined portion between the first channel and the second channel for smoothly turning the direction of the molten metal (fig 3); wherein a check valve is formed at the end of the screw comprises a central shaft rotably inserted in the

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chamber and a plurality of screw segments fitted over the outer circumference of the central shaft and arranged in the axial direction (col 5, lines 16-19).

However, Wang et al lacks the mentioning of a clamping device adapted to open or close a movable mold relative to a stationary plate in a horizontal direction and a slitwise channel is disposed in the nozzle.

Bradley et al discloses a clamping device (22) is adapted to open or close a movable mold relative to a stationary plate. The mold halves define a suitable cavity (27) in communication with the nozzle having a slitwise channel (figure 1, col 3, lines 35-54). Bradley teaches the use of the clamping device in order to form or shape the final product. Therefore, it would have been obvious to provide a clamping device in Wang et al in order to form and shape the final product as taught by Bradley et al.

4. Claims 1-9, 17, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono (US Patent No. 5,836,372) in view of Wang et al (US Patent No. 5,501,266) and Bradley et al (US Patent No. 5,040,589).

As to claims 1-7, 17 and 21 Kono discloses a plunger (45) moving in the horizontal direction is disposed in the second channel (figure 1), wherein the check valve (60) is disposed in the first channel for preventing metal in the second channel flowing backward to the first channel (figure 1). However, Kono fails to disclose a screw extruder at the first channel and a clamping device after the nozzle.

Wang et al discloses a method and apparatus of injection molding of semi solid metals comprising: a screw extruder (8) located substantially vertically and having an extrusion screw (18) rotationally at the inside of a chamber (19) (col 5, lines 8-12); a colling unit (24) for cooling a light metal material supplied in the chamber so as to be formed into a molten metal or semi solid solidified slurry (col 5, lines 20-24); wherein the chamber also comprise a heating unit (25) for heating the material inside; a nozzle (28) connected at a base end thereof to a discharge port of the chamber and having a discharge port formed at a distal end thereof (col 5, lines 25-27); a hopper (1) is for storing the molten metal connected to an upper portion of the chamber (19) (col 4, line 51); the screw extruder (8) has an injection function of moving the extrusion screw in the axial direction to inject the molten metal or semi solidified slurry (fig 3); wherein the round portion is formed to a joined portion between the first channel and the second channel for smoothly turning the direction of the molten metal (fig 3); wherein a check valve is formed at the end of the screw comprises a central shaft rotably inserted in the chamber and a plurality of screw segments fitted over the outer circumference of the central shaft and arranged in the axial direction (col 5, lines 16-19).

Wang et al teaches the above differences in order to break the growing dendrites of the solid phase into small and nearly spherical particles by the shearing force generate by the screw and barrel. Therefore, it would have been obvious to provide Wang et al's screw extruder in Kono in order to break the growing dendrites of the solid phase into small and nearly spherical particles by the shearing force.

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Bradley et al discloses a clamping device (22) is adapted to open or close a movable mold relative to a stationary plate. The mold halves define a suitable cavity (27) in communication with the nozzle having a slitwise channel (figure 1, col 3, lines 35-54). Bradley teaches the use of the clamping device in order to form or shape the final product. Therefore, it would have been obvious to provide a clamping device in Kono and Wang et al in order to form and shape the final product as taught by Bradley et al.

As to claim 8, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to have a compression ratio of 1, since the related art teach extrusion resulting in compression of the molten metal. Therefore, it would have depend on the design expediency and regarding to time constraint, increasing or decreasing compression ratio would result in fast or slow production of the metal product.

As to claim 9, it would have been obvious that the shaft of the screw extruder to be heat resistance to the molten metal in order to rotate the metal.

5. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono (US Patent No. 5,836,372) in view of Wang et al (US Patent No. 5,501,266) Bradley et al (US Patent No. 5,040,589) and Rock (US 3,773,098).

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As to claims 10-15, Kono, Wang et al, and Bradley et al disclose the claimed invention substantially above, but fails to mention a static mixer disposed in the nozzle. Kono discloses a heating member disposed at the periphery of the nozzle for setting the temperature of the light metal for forming a solid plug (col 4, lines 46-57), but fails to disclose a static mixer in the nozzle.

Rock discloses a static mixer with stirring blades connected in front of a nozzle (figure 4, col 1, lines 23-33) for the purpose of having efficient and uniform mixing at the nozzle prior to the mold for producing the final product.

Therefore, it would have been obvious to one of ordinary skill in the art to have provide a static mixer in Kono in order to have efficient and uniform mixing prior to molding as taught be Rock.

6. Claims 18-20, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono (US Patent No. 5,836,372), Wang et al (US Patent No. 5,501,266) Bradley et al (US Patent No. 5,040,589) and Mercer, II et al (US 5,388,633).

As to claims 18, 20 & 23, Kono, Wang, and Bradley fail to disclose a melting furnace for heating the solid material into molten metal and a supply unit for supplying the molten metal in the melting furnace by way of a supply pipeline shielded with an inert gas to the hopper; a level sensor for detecting the surface height and a control device for controlling the amount of the molten metal supplied to the hopper based on the signal from the level sensor.

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Mercer, II et al discloses a melting furnace (10) for heating molten metal and being located substantially at the identical ground level with that of clamping device (68), and a molten metal supply unit for supplying the molten metal in the melting furnace (10) by way of a supply pipeline shielded (16) with an inert gas to the injection sleeve (col. 8, lines 64-69).

Although Mercer, II et al teaches molten metal deliver to the injection sleeve, it would also have been capable of supplying to a hopper and then to the injection sleeve, wherein both concept would result in the same outcome.

Mercer, II et al teaches the above differences in order to meet the demands of rapid and consistent fabrication of high quality die cast parts (col. 3, lines 41-44). Therefore it would have been obvious to one of ordinary skill in the art to have provide Mercer, II et al's apparatus in order to achieve rapid and consistent fabrication of high quality die cast parts.

As to claim 19, although, Mercer, II et al did not teach a level sensor for detecting surface height in a hopper, and a control device for controlling the amount of molten metal supplied to the hopper based on the signal from the level sensor.

Mercer, II et al teaches measuring the amount of molten metal supplying into the shot sleeve, and a control device for controlling the amount of the molten metal supplied from the melting pot to the shot sleeve (col. 11, lines 54-69 through col. 12, lines 1-11). Therefore, with this disclosure, one of ordinary skill would have used Mercer, II et al's

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control device in any arrangement and design expediency and would result in the same final result.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Len Tran whose telephone number is (703)605-1175.

The examiner can normally be reached on M-F, 8:30 - 5.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 703-308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3602 for regular communications and (703)305-3602 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Len Tran
Examiner
Art Unit 1722



LT
March 8, 2001


TOM DUNN
PRIMARY EXAMINER
A.U. 1722